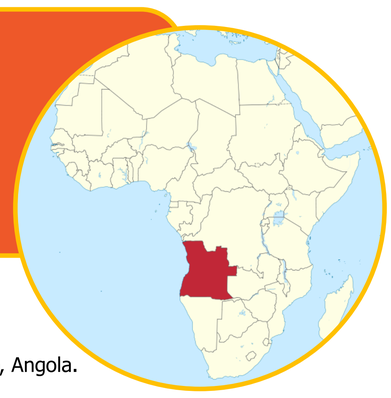
Aetiology of Diahrroea in children under five at the Bengo General Hospital, Angola



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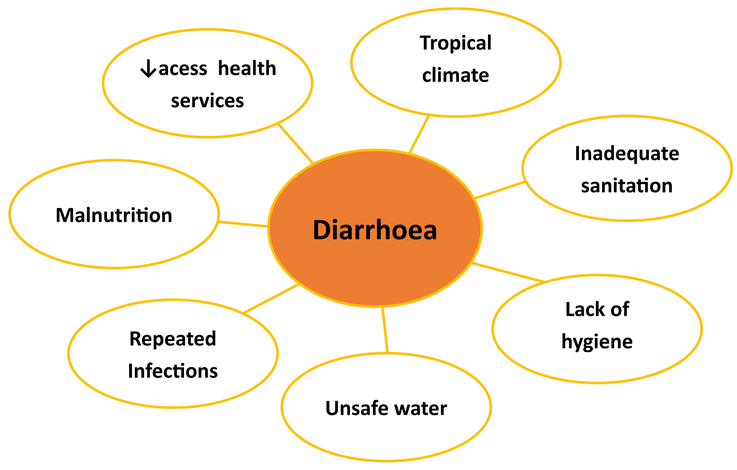
Background

Diarrhoea is the second leading cause of death in children under five years being responsible for 760.000 deaths, corresponding to 9% of the total deaths in this age group[(1,2)]. Africa is the region with more deaths due to diarrhoea (46%), followed by South Asia (38%). Three quarters of the total of deaths occurs within only 15 countries and Angola is in the 15th position with a record of 20,000 annual childhood deaths[(3,4)]. Diarrhoeal disease can be caused by bacterial, viral and parasitic infectious agents and can be transmited through contaminated food or drinking water, or directly from person to person[(3,4)]. *Rotavirus* and *Escherichia coli* were shown the most frequent pathogenic agents in developing countries[(2,3,4)].



Fig– 1— Risk factors that contribute to diarrhoeal disease.

Objective

This study aims to identify the most frequent pathogenic agents of diarrhoea in children under five atttending the Bengo General Hospital (BGH).

Fig-2— Pediatric Urgency Service at The BGH

Material and Methods

Subjects and sample collections:

The study was conducted between September 2012 and December 2013 at the Bengo General Hospital (BGH), located in Caxito, the capital of Bengo´s Province, a city 60 km northeast of Luanda. The study protocol was approved by the Angolan Ministry of Health Ethics Committee. A stool sample was collected from each child with diahrroea[(5)] to investigate viral, bacterial and parasitic agents. A sociodemographic questionnaire was applied. Clinical data was recorded and nutritional status was assessed using weight for age z-scores (WAZ): Mild malnutrition was defined as WAZ between -2 and -1, moderate malnutrition between -2 and -3, and severe malnutrition under -3.

Laboratory methods are presented in fig 3:

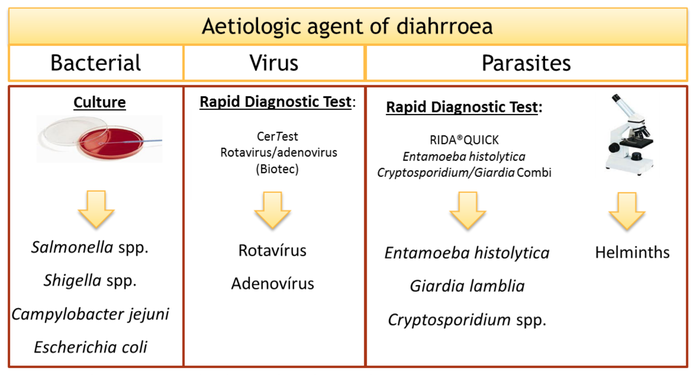


Fig-3— Laboratory methods used in the study.

Results

Of the 344 children recruited, 184 (54%) were male and 160 (47%) were female (Fig. 4). The mean age was 15,4 ± 12,3 (SD) months. There were more cases of diarrhoea among boys under 12 months (OR=1,639; p<0,05; IC=]1,068;2,515[). Fever (74,6% - 255/342) and vomiting (51,5% - 176/342) were the symptoms more frequently associated, followed by bloody diarrhoea (7% - 24/341). Considering the nutritional status, 58,4% (201/328) were malnourished, of whom 55,7% (112) were moderate to severe malnourished. At least one of the searched pathogens were detected in 76,6% (263/344) of the cases (Table 1), and multiple pathogen infections were detected in 34% (117/344) of the participants. *Escherichia coli* was the only bacterial agent isolated.

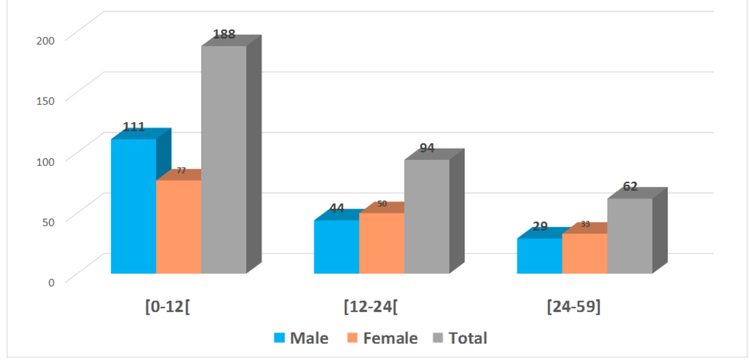


Fig. 4— Distribution of sex by age in months.

Table 1: Frequency of pathogenic agent isolated from fecal samples of children by age (months), sex and season.

				Age					Sex					Season				
Method	**Pathogenic agent**	***N***	***n (%)***	**[0-12[** (n=188) n(%)	**[12-59]** (n=156) n(%)	***p***	**OR**	**IC95%**	**Male** (n=184) n(%)	**Female** (n=160) n(%)	***p***	**OR**	**IC95%**	**Dry** (n=156) n(%)	**Rainy** (n=188) n(%)	***p***	**OR**	**IC95%**
Bacteria																		
Culture	***Escherichia coli***	344	**138 (40,1)**	**90 (47,9)**	**48 (30,8)**	**0,01**	**2**	**1,325; 3,223**	82 (44,6)	56 (35				**81 (51,9)**	**57 (30,3)**	**<0,01**	**2,48**	**1,595; 3,862**
Virus																		
Rapid antigen test	**Rotavirus**	342	**86 (25,1)**	**69 (80,2)**	**17 (11)**	**<0,01**	**4,7**	**2,604; 8,386**	49 (26,8)	37 (23,3)				44 (28,2)	42 (22,6)			
	Adenovirus	342	13 (3,8)	10 (5,3)	3 (1,9)				9 (4,9)	4 (2,5)				5 (3,2)	8 (4,3)			
Parasites																		
Microscopy	***Giardia lamblia***	344	33 (9,6)	13 (6,9)	20 (12,8)				20 (10.9)	13 (8,1)				12 (7,7)	21 (11,2)			
	Ascaris lumbricoides	344	14 (4,1)	4 (2,1)	10 (6,4)				9 (4,9)	5 (3,1)				9 (5,8)	5 (2,7)			
	Strongyloides stercoralis	344	12 (3,5)	5 (2,7)	7 (4,5)				6 (3,5)	6 (3,8)				8 (5,1)	4 (2,1)			
	Cryptosporidium spp.	344	9 (2,6)	8 (4,3)	1 (0,6)				7 (3,8)	2 (1,2)				4 (2,6)	5 (2,7)			
	Hymenolepis nana	344	6 (1,7)	2 (1,1)	4 (2,6)				5 (2,7)	1 (0,6)				3 (1,9)	3 (1,6)			
	Trichuris trichiura	344	1 (0,3)	0	1 (0,6)				1 (0,5)	0				1 (0,6)	0			
	Taenia spp.	344	2 (0,6)	1 (0,5)	1 (0,6)				1 (0,5)	1 (0,6)				0	2 (1,1)			
Rapid antigen test	***Cryptosporidium spp.***	337	**101 (30)**	**77 (41,6)**	**24 (15,8)**	**<0,01**	**3,8**	**2,250; 6,427**	**62 (34,6)**	**39 (24,7)**	**<0,05**	**1,6**	**1,006; 2,600**	**38 (24,4)**	**63 (34,8)**	**<0,05**	**0,6**	**0,347; 0,971**
	Giardia lamblia	338	71 (21)	42 (22,7)	29 (19)				37(20,6)	34 (21,5)				33 (21,2)	38 (20,9)			
	Entamoeba histolytica	338	11 (3,3)	**2 (1,1)**	**9 (5,9)**	**<0,05**	**0,2**	**0,037; 0,822**	7 (3,9)	4 (2,5)				6 (3,8)	5 (2,7)			

Conclusion

This study identified several infectious agents that can cause diarrhoea in children under five years. *Escherichia coli*, *Rotavirus, Cryptosporidium* spp. and *Giardia lamblia* were the most frequent pathogens. Children under 12 months seem to be more susceptible to infections by multiple pathogens, emphasizing the importance of diarrhoeal disease in this age group. Therefore it is important to understand diahrroea etiology for better therapeutic conduct and, in a larger level, for making more effective health policies. This research study contributed with relevant data, useful for future hospital-based studies.

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